

**Notice of Allowability**

Application No.

10/613,833

Applicant(s)

OHKAWA, TIHIRO

Examiner

Art Unit

David A Reifsnyder

1723

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

- This communication is responsive to communication filed on December 31, 2003.
- The allowed claim(s) is/are 1-20.
- The drawings filed on 31 December 2003 are accepted by the Examiner.
- Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a)  All    b)  Some\*    c)  None    of the:
  - Certified copies of the priority documents have been received.
  - Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

- A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
- CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.  
(a)  including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached  
    1)  hereto or 2)  to Paper No./Mail Date \_\_\_\_\_.  
(b)  including changes required by the attached Examiner's Amendment / Comment or in the Office action of  
    Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
- DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- Notice of References Cited (PTO-892)
- Notice of Draftsperson's Patent Drawing Review (PTO-948)
- Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
    Paper No./Mail Date 10/31/2003
- Examiner's Comment Regarding Requirement for Deposit  
    of Biological Material
- Notice of Informal Patent Application (PTO-152)
- Interview Summary (PTO-413),  
    Paper No./Mail Date \_\_\_\_\_.
- Examiner's Amendment/Comment
- Examiner's Statement of Reasons for Allowance
- Other \_\_\_\_\_.

## REASONS FOR ALLOWANCE

The main reason for the allowance of claims 1-7 is the instantly claimed device for separating particles of relatively high mass/charge ratio: ( $M_1$ ) from particles of relatively low mass/charge ratios ( $M_2$ ), said device comprising: a cylinder having a first end and a second end with a wall extending therebetween to define a chamber with a longitudinal axis, a means for generating an axially aligned magnetic field ( $B_z$ ) in said chamber, a plurality of substantially rectangular shaped coils mounted on said wall of said cylinder with each coil having a pair of opposed sides oriented substantially longitudinally, and a pair of opposed sides oriented substantially azimuthally relative to the axis; a means for sending alternating electrical currents through each said coil wherein said current in each said coil has a phase difference relative to the current in an adjacent said coil to generate a magnetic field ( $B_0$ ) in said chamber that is aliened substantially perpendicular to the axis; and rotates about the axis; and a means for introducing a multi-species plasma into said chamber for interaction with said rotating magnetic field ( $B_0$ ) to rotate said plasma in said axially oriented magnetic field component ( $B_z$ ) and induce a radially oriented electric field ( $E_r$ ) in said chamber to separate particles  $M_1$  from particles  $M_2$  in the crossed electric and magnetic fields ( $E_r \times B_1$ ).

The main reason for the allowance of claims 8-15 is the instantly claimed device for separating particles with relatively high mass to charge ratios ( $M_1$ ) from particles with

relatively low mass to charge ratios ( $M_2$ ), said device comprising: a means for rotating a magnetic field about an axis; a means for introducing a multi-species plasma containing particles  $M_1$  and particles  $M_2$  into the rotating magnetic field to rotate the multi-species plasma, and a means for establishing a substantially axially aligned magnetic field for interaction with said rotating multi-species plasma to induce a radially oriented electric field and separate the particles  $M_1$  from the particles  $M_2$  in the axially aligned magnetic field and radially oriented electric field.

The main reason for the allowance of claims 16-20 is the instantly claimed method for separating particles of relatively high mass/charge ratios ( $M_1$ ) from particles of relatively low mass/charge ratios ( $M_2$ ) which comprises the steps of: rotating a magnetic field about an axis, introducing a multi-species plasma containing particles  $M_1$  and particles  $M_2$  into the rotating magnetic field to rotate the multi-species plasma; and establishing a substantially axially aligned magnetic field for interaction with said rotating multi-species plasma to induce a radially oriented electric field and separate the particles  $M_1$  from the particles  $M_2$  in the axially aligned magnetic field and radially oriented electric field.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ohkawa (6,287,463 B1) who discloses a collector cup for the collection and removal of low mass particles from the exit of a plasma mass filter.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David A Reifsnyder whose telephone number is (571) 271-1145. The examiner can normally be reached on M-F 9:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda M Walker can be reached on (571) 272-1151. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
David A Reifsnyder  
Primary Examiner  
Art Unit 1723

DAR